myths and songs from the South Pacific, by Dr. C. Crüger.—On the metamorphosis of amphibia, by Dr. J. W. Spengel.—Some diagnoses of new Heteromera, by Dr. Haag-Rutenberg.—Descriptions of some new butterflies from the Philippine Islands, by G. Semper.—On the species of the butterfly-genus *Zethera*, by the same.—On butterflies from Wladiwostock and from the Gaboon River, by Dr. C. Crüger.—On dimorphism and variations of some North American butterflies, by J. Boll.—On the metamorphosis of *Sepedon*, by G. Gercke.—On *Helix alonensis*, Fer., by H. Strebel.—Note on the geography of molluscs, by J. D. E. Schmeltz.—On the miocene formation of Reinbeck and its mollusc fauna, by Carl Gottsche.—On the geognostical conditions of the neighbourhood of Kiel, by Dr. A. Braasch.—On petroleum springs, by S. B. Guttentag.—Ornithological notes on the fauna of the Lower Elbe, by F. Böckmann.—On the lepidoptera fauna of the same district, by L. Graeser and A. Sauber.

THE *Jahrbuch der kais. kön. geologischen Reichsanstalt zu Wien* (1879, part 1, January—March) contains the following papers:—On the metalliferous deep eruptions of Zinnwald-Altenberg (on the Saxon-Bohemian frontier), and on the tin-mining in that district, by E. Reger (with plates).—On the tertiary formation of Waldböckelheim (near Kreuznach, Rhenish Prussia) and its *polyparium* fauna, by Dr. A. von Klipstein.—On the geology of the Rhodope Mountain chain, south and south-east of Tatar Pazardžik, by Anton Pelz.—On the jurassic limestone rock *débris* in the diluvial formation of Moravia and Galicia, by Anton Rzehak.—Geological sketch of the highest part of the Sierra Nevada in Spain, by Dr. Richard von Drasche. This sketch is highly interesting and elaborate; it is accompanied by several plates and numerous illustrations.—On some limestones containing *orbitoida* and nummulites from the so-called "Goldberg" near Kirchberg, on the Wechsel Mountain (Austria), by Franz Toula.—Researches on the age of the North-Bohemian brown-coal (lignite) formation, by D. Stur.—On the productivity and the geotectonic conditions of the Caspian naphtha districts, by Hermann Abich.

THE *Moniteur Scientifique* (Paris: June, 1879), amongst numerous papers, which are noticed by us elsewhere, contains the following papers:—On the influence which a change of temperature exercises upon the deviation which inverted sugar produces upon polarised light, by Paul Casamajor.—On the acceleration in the tanning of hides by means of phosphoric acid, by E. Ador.—On "antichlore" (hyposulphite of soda), by M. G. Lunge.—On ozokerite and ceresine from Galicia, by Dr. J. Grabowsky.—Researches on the root of *Alstonia*, by O. Hesse.—On the use of anhydrous chloride of calcium as a conservative for steam-boilers, by M. Burstyn.

THE *Journal of the Russian Physico-chemical Society* (vol. xi. No. 5) contains the following papers:—On the amines containing tertiary alcoholic radicals, by M. W. Rudneff.—On tertiary isosulphocyanates, by the same.—On the polarisation of electrodes, by M. A. Sokoloff.

THE *Rivista Scientifico Industriale* (Nos. 8 and 9, 1879).—From these numbers we note the following papers:—On a direct application of the free fall of bodies, by G. Mocenigo.—On the atmospheric whirlstorm of February 24—25, by Prof. L. Respighi.—On a telephonic microphone for demonstration at schools, by Prof. G. Cantoni.—On a new method to determine the specific gravity of liquids, by Prof. M. Cagnassi.—On some new phenomena connected with the plasticity of solids, by Prof. C. Marangoni.—On some phenomena due to the viscosity of liquids, by the same.—On sand showers, by Prof. Tacchini.—On a telephotographic apparatus with a single wire, by Prof. C. Perossino.—On the magnetic properties developed in nickel and cobalt by induction compared to those of iron, by Prof. T. Martini.—On a new steelyard-densimeter, by Dr. C. Chistoni.

THE *Revue Internationale des Sciences* (May, 1879) contains the following papers:—On the glacial epoch, by Th. Kjerulf.—On the reciprocal assistance which descriptive and geographical zoology may render to each other, by M. Lataste.—On the colouring-matter of urine, by M. Masson.—On the mechanical theory of the position of leaves, by Dr. Schwendener.—The number, besides the above, contains an interesting account of the organisation of medical instruction at Lyons, as well as an excellent review by M. C. Issaurat of Dr. F. Isnard's new book entitled "Spiritualisme et Matérialisme." This serial has considerably improved since it appears only in monthly parts instead of in weekly numbers as it did up to the beginning of 1879.

Mittheilungen der naturforschenden Gesellschaft in Bern (Nos. 923-936, 1877).—From this part we note the following papers of interest:—Botanical and geological notes from a tour in the province of Reggio in Calabria, by J. Coaz.—On the most important conditions of shape in the leaf of phanerogamic plants, by Herr Fankhauser.—On the principal laws of growth in Florideæ, by the same.—On the formation of the stem in *Lepas anatifera*, by Dr. Lang.—On some luminous bacteria, by Dr. M. Pertz.—Various notes on electrical instruments, by Herr Rothen.—On the soda efflorescences in the Ganges districts, by Prof. Schwarzenbach.—On the geology of Kerguelen's Land, by Prof. Th. Studer.—On deep-water siphonophora, by the same.—On the coloration of the retina, by Dr. A. Valentin.—On some preparations preventing fermentation, and their applicability for the conservation of food.

THE *Giornale di Scienze naturali ed economiche* (Palermo, 1878, vol. xiii.) contains the following papers:—On the cornea of osseous fishes; contribution to the morphology of the eye of vertebrates, by Dr. C. Emery.—On the solar spots observed at Palermo in 1877 and the first three months of 1878, and on the frequency of the vapours of iron and magnesium at the solar surface, by P. Tacchini.—Enumeration and synonyms of the conchyfera of the Mediterranean, by the Marchese di Monterosato.—On the fossils of the crystalline limestone of the Casale and Bellampo Mountains in the province of Palermo, by Prof. G. G. Gemmellaro.

Reale Istituto Lombardo di Scienze e Lettere, Rendiconti, vol. xii. fasc. viii.—Mechanical demonstration of the second principle of thermodynamics, by S. Crotte.—On functions whose first derivatives belong to the class zero, by Prof. Ascoli.—Imaginary plane of linear complex and its intersections, by S. Aschieri.

Fasc. ix.—Prophylaxis of the plague, by Dr. Zucchi.—Researches on the electric conductivity of carbon, by Prof. Ferrini.—On the product of the more integrable and finite functions, by Prof. Ascoli.

SOCIETIES AND ACADEMIES

LONDON

Mathematical Society, June 12.—C. W. Merrifield, F.R.S., president, in the chair.—Mr. R. C. Rowe was proposed for election.—The following communications were made:—Notes on the reduction of a system of forces; and on plane curves, by Mr. J. J. Walker.—Notes on determinants of *n* dimensions, by Mr. Lloyd Tanner.—Curves for the inscription of a regular nonagon and undecagon in a circle, by the Rev. Dr. Freeth.—On Clifford's graphs and on the twenty-one co-ordinates of a conic in space, by Dr. Spottiswoode, P.R.S.—Two geometrical notes, by Prof. H. J. S. Smith, F.R.S.

Chemical Society, June 5.—Mr. Warren De La Rue, president, in the chair.—It was announced that a ballot for the election of Fellows would be held at the next meeting (June 19).—The following papers were read:—A contribution to the theory of fractional distillation, by T. E. Thorpe. The author has observed that of a mixture of equal volumes of carbon tetrachloride, boiling point 76°·6, and of methyl alcohol, boiling-point 65°·2, 46·5 per cent. of the whole distils over at 55°·6–55°·9, 10° lower than the boiling point of its most volatile constituent.—Preliminary note on the action of organo-zinc compounds on quinones, by F. R. Japp. The author has studied the action of zinc ethyl on phenanthrene quinone and obtained a substance crystallising in faintly-yellowish plates having the composition $C_{16}H_{14}O_2C_2H_6O$; he hopes by these reactions to distinguish quinones from double ketones.—Third report to the Chemical Society on researches on some points in chemical dynamics, by Dr. Wright, Messrs. Luff and Rennie. This is a lengthy paper in which the action of carbonic oxide and hydrogen on a uniform weight of copper oxide has been studied at various temperatures; the results are plotted out in numerous curves; in all cases carbonic oxide reduces more quickly or at a lower temperature than hydrogen.—On fractional distillation, by F. D. Brown. The author has studied with great care the distillation of mixtures of benzene and carbon disulphide.—On chlorstannic acid, by J. W. Mallet. A bottle containing a strong solution of stannous chloride after standing for a year deposited a transparent jelly-like substance which proved to be SnO_2HCl. Soda and ammonia salts were obtained.—On indigopurpurin and indirubin, by E. Schunck.

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Baeyer and Emmerling obtained a red-colouring matter from isatin, which they named indigopurpurin; this is identical with indirubin obtained by the author from indican. The author considers that the name indigopurpurin should be abolished.

Physical Society, May 24.—Prof. W. G. Adams in the chair.—New Members: Mr. Sedley Taylor, M.A., and Mr. Walter Emmott, A.S.T.E.—Mr. W. J. Wilson exhibited a new harmonograph and figures drawn by it. The figures drawn by prior harmonographs are all more or less imperfect owing to loss of motion in the pendulums actuating the marking pen; and Mr. Wilson therefore designed a new harmonograph which not only gives perfect figures but admits of the phase of either of the two compounded motions being decreased by a known amount. In this instrument toothed wheels take the place of pendulums, the ratio of the teeth giving the ratio of the periods of the motions. By employing the device of an intermediate wheel gearing with two others, and arranging two or more wheels on the intermediate axle, a great variety of phase can be obtained for each motion. An ingenious adjustment by means of a movable nut allows the phase of either or both motions to be altered to a known extent, and thus an endless variety of figures can be obtained. As in other harmonographs a writing-table on which the paper is placed, and an aniline glass pen, are used. Several of the figures done also on glass were thrown on the screen, the stereoscopic effect being very apparent. In reply to a query Mr. Wilson said that he had adapted some of the figures to the stereoscope.—Prof. Hughes explained his new induction balance and showed some of its principal effects. It is well known that on starting an electric current along a wire adjacent to another wire, an induced current is set up in the second wire in an opposite direction to the first or primary current. In the induction balance two primary circuits or coils are taken, with the same current (interrupted by a microphone acted upon by the ticking of a clock) running through both, and between these is placed a secondary circuit or coil in connection with a telephone. The primary coils are so wound as to oppose each other's induction on the intermediate secondary. There is a point, moreover, between these, where these opposed inductive influences exactly neutralise each other. If the secondary coil be placed there, no induced ticking of the clock can be heard; but if the secondary be displaced to one or other side of this point, the ticking can be heard in the telephone increasing in loudness as the secondary approaches one or other of the primaries. If the distance between the primaries be graduated into a scale, this contrivance becomes a sonometer, since it gives an absolute zero of sound, and degrees of loudness. It is well adapted for measuring the hearing power of the ear. By splitting the secondary coil into two parts and placing each close to its proper primary, so that there are four coils in all arranged in two pairs, the extremes in one primary circuit, and the means in one secondary, the two opposing parts of the balance can be separated from each other, so as not to disturb each other's action, and the balance made very sensitive by the closeness of the primaries and secondaries. Prof. Hughes finds that there is a line or zone of maximum induction midway between each primary and its secondary. If a conductor such as a piece of metal be put in this position it has a maximum disturbing effect on the balance, due probably to the electric currents generated in it by the induction. The effect is apparently proportional to the conductivity of the metal. It requires an exactly similar piece of metal put between the other pair of coils to restore the equilibrium of the balance. A difference of alloy, or of weight between two like coins is at once observed from the imperfect restitution of the balance; base coins are thus also at once detected. Again, it is possible for a person to tell what particular coin or coins are in one part of the balance by trial of the same coins in his part. When plates of non-magnetic metals are held vertical in the balance their disturbing effect is *nil*; iron on the other hand gives its maximum effect on this position, because its magnetic effect overbalances its electrical effect. Two pieces of iron may therefore neutralise each other as cores in an induction coil. Steel is easy to balance compared with soft iron. Zinc disturbs most when placed along the sides of each pair of coils; iron when in centre at a certain length of metal laid along the outsides of the coils produces silence. The maximum line of inductive force is midway between the coils, and there is a line of minimum force at half the thickness of each coil. A metal placed at these lines of minimum force has no disturbing effect on the balance. Pressure applied to small shot, or spongy gold, alters the balance. The effects of stress, heat, magnetism, light, &c., on matter could be determined by the balance. Prof. W. G. Adams believed that one result of Prof. Hughes's experiments will be the determination of the way in which the law of electro-dynamic induction depends on density. He also imagined that the metal when in the maximum line between the coils gathered the lines of force to itself, whereas when on the minimum lines it could not thus divert them. Prof. Ayrton cited the early experiment of Faraday with a sheet of copper oscillating to rest between two opposite magnetic poles. The copper took a long time to stop; but a sheet of iron placed between two like poles was soon stopped owing to its becoming imbued with an opposite polarity, and deflecting the lines of force. He also suggested that the divergence of the results for conductivity of metals got by the induction balance from those got by the Wheatstone balance might be due to that electric inertia suspected by Sir William Thomson. Prof. Guthrie thought that the induction balance pointed to the conclusion that the disturbing effect of a conducting mass applied in this way is proportional to the quantity of electricity generated in it under certain conditions of temperature, &c. The determination of the conductivity of liquids would be a useful application of the balance. Mr. Chandler Roberts gave some results which he had obtained from an examination of certain alloys by means of the induction balance. He had been able to detect a difference of one part in 1,000 in the amount of silver in two shillings of equal weight. He also pointed out that Mathiessen divided alloys into three classes: (1) solidified solutions of one metal in another; (2) solidified solutions of one metal in an allotropic modification of another metal; (3) solidified solutions of allotropic modifications of both metals. For the first class the curve of electric conductivity is a straight line, for the second a parabolic curve, for the third a bent line. Mr. Roberts found that the balance gave the characteristic curve for the first class with an alloy of lead and tin, and for the second with an alloy of gold and silver. With a copper tin alloy, which is a good example of the third class, he found the curve given by the balance to be intermediate between Alfred Risch's curve of density and Mathiessen's curve of conductivity, and considers that the balance is influenced by the density as well as the conductivity of the metal interposed. Prof. Hughes said that as the working of metals appeared to affect their conductivity he was inclined to rely more on the conductivity measurements of the balance than on those of the Wheatstone bridge. By the balance plain pieces of metal were taken, whereas by the bridge wires were mostly taken. He would rather not give any theory yet as to the results obtained from the balance.—Dr. Erck then exhibited his novel pump for lifting solutions out of batteries. It consists of a closed vessel, funnel-like, the stem dipping into mercury, a column of which ascends the latter to a certain height. Two tubes emerge from the cover, one dipping into the liquid, the other opening to the air. By altering the pressure inside the vessel the solution rises to the latter, and can escape from it by trickling through the mercury.

Anthropological Institute, June 18.—Mr. Hyde Clarke, vice-president, in the chair.—The following new Member was announced: Mr. William Wavell, late of the Bengal Civil Service.—A paper was read by Miss A. W. Buckland on some Cornish and Irish prehistoric monuments. The authoress compared the sepulchral and the non-sepulchral monuments existing in the two countries, pointing out the differences between them, as indicating, either that they were erected by different tribes, or at various periods, and calling especial attention to the absence in Cornwall of the round towers, so common in Ireland, as well as of oghams, and those peculiar markings found in the Irish chambered tumuli at New Grange, Dowth, &c., as also in similar monuments in the north of Scotland and in Brittany. These markings are believed by Miss Buckland to represent the tribal or tattoo marks of the Picts or a kindred race, being one of many different tribes brought by tradition from the neighbourhood of the Euxine, a tradition apparently confirmed by the decidedly eastern characters of the jewellery found in Ireland, as well as by the megalithic monuments which can almost all be traced to Eastern Europe, and thence through Western Asia to India. Notwithstanding this apparently common origin, Miss Buckland pointed out that they are almost everywhere arranged in groups suggestive of a difference of race in their constructors, and expressed a hope that some day a map of the world would be constructed showing these groupings, which would be a great help to students of ethnology and archæology.—Mr. C. Pfoundes also read a paper entitled "Some Facts about Japan and its People," and exhibited drawings in illustration of the same.

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Entomological Society, June 4.—H. W. Bates, F.L.S., F.Z.S., vice-president, in the chair.—The following elections took place:—Mr. J. Walhouse, F.R.A.S., Maida Vale, as an Ordinary Member, Señor Antonio Augusto de Carvatho Monteiro, Lisbon, as a Foreign Member, and Mr. C. H. Goodman, Lesness Heath, as a Subscriber.—Mr. McLachlan called attention to a notice lately published by M. F. A. Forel, concerning certain sculptured markings on cretaceous pebbles from the shores of Lake Leman, in which the author has come to the conclusion that the markings were mainly due to the action of larvæ of trichoptera, which formed galleries on the surface. Mr. McLachlan exhibited plaster casts of two small blocks, one of Jurassic limestone, the other of ordinary white chalk which had been placed in the lake by M. Forel for some months, and which showed markings that apparently confirmed the theory that such were due to the agency of trichopterous larvæ, of which some specimens in alcohol were also exhibited.—Mr. J. S. Baly communicated a paper entitled "An attempt to point out the differential characters of some closely allied species of *Chrysomela*, chiefly those contained in Suffrian's 11th group; also descriptions of some hitherto uncharacterised forms belonging to the same and other genera of the family."—The following papers were communicated by Prof. Westwood:—"A decade of new Cetoniidæ," and "On some unusual monstrous insects."—Mr. W. L. Distant read a paper entitled "Contributions to our knowledge of the hemipterous fauna of Madagascar."—Sir Sydney Saunders communicated some notes received from M. Jules Lichtenstein, describing the metamorphoses of the blister-beetle *Cantharis versicatoria*, which he had recently succeeded in rearing from the egg.—Mr. Meldola communicated a translation of a paper by Dr. Fritz Müller, recently published in *Kosmos*, entitled "Ituna and Thyridia; a Remarkable Case of Mimicry in Butterflies."

Victoria (Philosophical) Institute, June 16.—The president, the Earl of Shaftesbury, in the chair.—Capt. F. Petrie (the Honorary Secretary) read the report. It appeared that the Society had lost twenty by death, and twelve members and eighteen associates by resignation, since the last annual meeting, but that eighty-six new members had joined in that time. The total number of members is now 785. The address was delivered by Dr. Radcliffe, and took the form of an inquiry into the present position of physical science.

EDINBURGH

Royal Society, June 16.—Prof. Maclagan, vice-president, in the chair.—The following communications were read:—Atomicity or valence of elementary atoms: is it constant or variable? by Prof. Crum Brown.—On the action of heat on salts of primethyl-sulphine, part iv., by Prof. Crum Brown and J. Adrian Blaikie, D.Sc.—Comparison of the salts of methyl-diethyl-sulphine, and of ethyl-methyl-ethyl-sulphine, by Prof. Crum Brown and J. Adrian Blaikie, D.Sc.—On the bursting of fire-arms when the muzzle is closed by snow, earth, grass, &c., by Prof. George Forbes.—On some new bases of the leucoline series, part iii., by G. Carr Robinson and W. L. Goodwin.

BOSTON (U.S.A.)

American Academy of Arts and Sciences, May 14.—Hon. Charles Francis Adams in the chair.—Dr. H. P. Bowditch presented a new form of plethysmograph differing from those of Mosso and von Basch in the method adopted for securing a constant level of the fluid in the receptacle connected with the apparatus which contained the body whose changing volume was to be measured. The method consisted in suspending the receptacle (a large sized test tube) to a delicate spiral steel spring of which the length and strength were so adjusted that the weight of the fluid flowing into the test tube caused an elongation of the spring precisely equal to the rise of the fluid in the test tube itself. Thus the absolute level of the fluid in the receptacle remained unaltered, and a constant pressure was maintained upon the surface of the organ to be measured. An index attached to the lower end of the spring recorded upon a revolving cylinder covered with smoked paper the flow of the fluid into and out of the receptacle.—Mr. N. D. C. Hodges gave two new proofs of the dimensions of molecules, one based upon the properties of water and aqueous vapour, the other upon superficial tension and considerations of the depth of the superficial layer of molecules upon sheets of platinum.—Prof. Pickering exhibited a new form of photometer for measuring the light of a nebula or comet, by comparison with a star thrown out of focus. The method employed eliminated the effects of moonlight or twilight. He also proposed to denote the light of these bodies in stellar magnitudes. Thus a portion of a nebula would be of the twelfth magnitude, if of the same brightness as a twelfth-magnitude star spread over a circle one minute in diameter.—Prof. John Trowbridge presented two contributions from the Physical Laboratory of Harvard College, one on the vibration of elliptical plates, and one on a new method of studying wave-motion and vibrations on the surface of mercury. The mercury is covered with a very thin film of lycopodium dust, and is illuminated by the electric spark produced by breaking a circuit on the surface of the mercury.—Prof. C. Loring Jackson and Mr. J. Fleming White announced a new synthesis of anthracene.—Prof. Asa Gray presented the characters of new species of plants from Mexico, collected by Dr. E. Palmer and Dr. C. C. Parry.—Prof. Wolcott Gibbs, a research on complex inorganic acids; and Mr. Sereno Watson, a revision of the North American liliaceæ and descriptions of some new species of other orders.

PARIS

Academy of Sciences, June 9.—M. Daubrée, president.—The following papers were read:—Chronometric observatories for the merchant marine, by M. Faye.—On the spherical regulating spiral of chronometers, by M. Phillips.—On the bases derived from aldehyde-ammonia, by M. Ad. Wurtz.—Determination of the height of the mercury in the barometer under the equator; amplitude of diurnal barometric variations at various stations in the Cordilleras, by M. Boussingault.—Increase of albumenoid matters in the saliva of those having albumenuria, by M. Vulpian.—On the spectrum of nitrate of didymium, by MM. Laurence Smith and Lecoq de Boisbaudran.—On the spectrum of nitrate of erbium, by M. Lecoq de Boisbraudran.—Observations made during the voyage of the frigate *La Magicienne*, by Admiral Serres.—The following papers were among the correspondence:—Observations of Comet II., 1867, made at the Observatory of Florence (Arcetri), by M. Tempel.—Transformation of a pencil of normals, by M. A. Mannheim.—On the use of elliptic functions in the theory of the plane quadrilateral, by M. G. Darboux.—On developments in series whose terms are Laplace's functions Y_n, by M. A. de St. Germain.—On the laws of dispersion, by M. Mouton.—On Stokes's law, by M. S. Lamansky.—On the absorption spectra of alizarin and some colouring-matters derived from it, by M. A. Rosenthal.—On the *verglas* of January 22, by M. de Tastes.—On the dissociation of ammonium sulphide, by MM. R. Engel and Mortessier.—Action of the vapour of water on carbonic oxide in presence of a red hot platinum wire, by M. J. Coquillion. On some derivatives of methyleugenol, by M. Wassermann.—On an isomer of angelic acid, dimethyl-acrylic acid, by M. E. Duvillier.—On the action of phenate of sodium in bacteriemic frogs, by M. Bacchi.—Hematic lesions in chlorosis, the serious anemia named progressive, and the anemia of nephritis, by M. Quinquand.—Researches on the localisation of arsenic in the brain, by MM. O. Caillol de Poncy and Ch. Livon.—Rectification in a communication of March 17 last, by M. Feltz.—Erratic blocks of the Valley of Lys (Haute-Garonne), by M. Gourdon.—Fall of meteorites on May 10, 1879, in Emmet County, Iowa, U.S., by Prof. Hinrichs.

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